

Algae in Aquatic Acres



Aquatic Acres

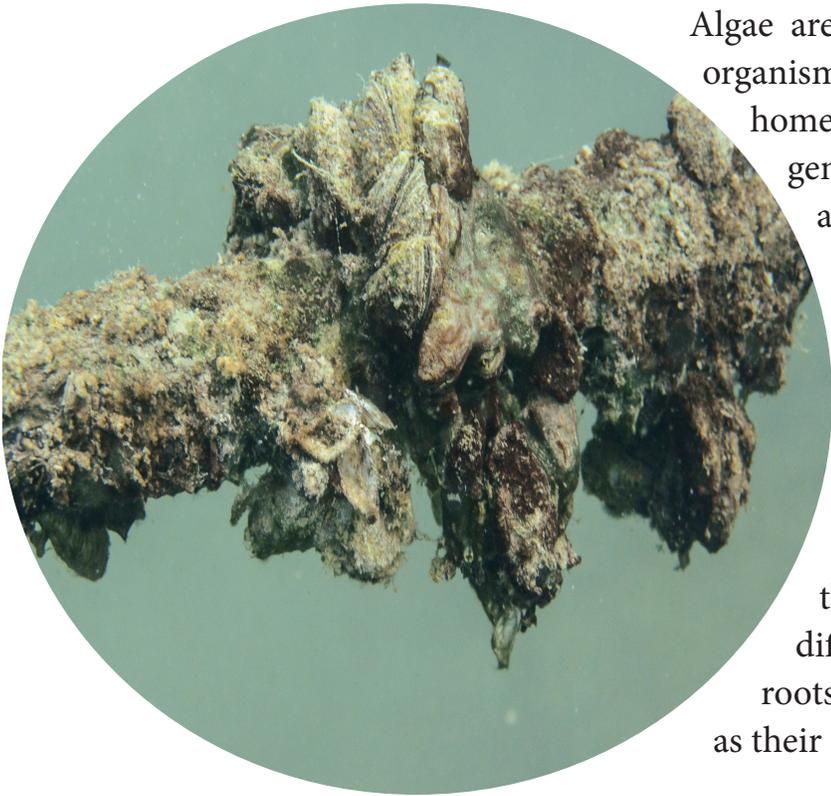


The Rochester Institute of Technology offers a class called Underwater Photography where students learn how to scuba dive. Rene Piccarreto Jr. runs the class and the equipment is provided by the Aquatic Center of Rochester. Open water dives take place at a quarry called Aquatic Acres located in Avon, New York. The quarry is a local divers playground with various sunken objects such as a boat and a car. When the students have received their open water certificates they then move on to the photography half of the course.

Underwater images were taken with the Nikon 1 AW1 Waterproof camera. While photographing, it was apparent that there were different forms of algae in different locations in the quarry. Algae samples were collected from the quarry in a water bottle. The first algae sample was collected near the shore of the quarry and looked green. (See image above.) The second sample was collected off the bottom of the quarry and was red in color. (Image on the right.)

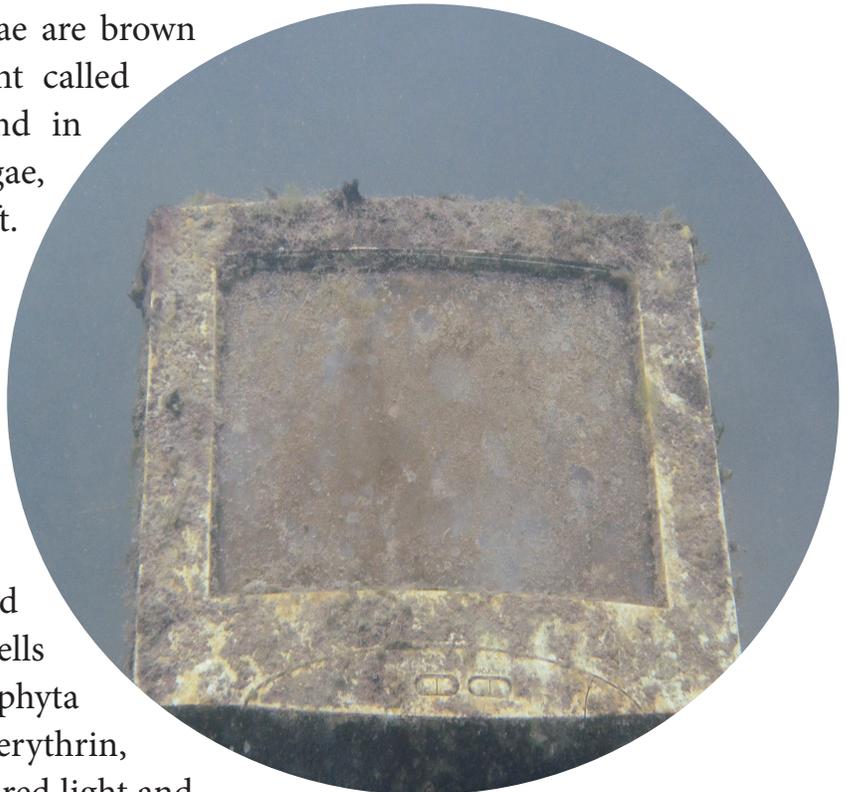


Algae



Algae are one of the most important organisms here on earth. Algae supply our home with between 70-80% of its oxygen. There are three general types of algae, red, green and brown. The total number of algae species is about 42,000 according to the Public Algaebase. The types of algae range from unicellular to 100ft multicellular organisms. They are similar to plants in that they obtain their energy through photosynthesis yet they differ in that they do not have roots. Many other animals use algae as their main source of energy.

The largest type is brown algae, which is in the Phaeophyta phylum. Brown algae are brown because they contain a pigment called fucoxanthin which is not found in other plants or algae. Brown algae, such as kelp, can grow up to 260ft. Brown algae are stationary due to a structure called a holdfast, which attaches itself to things such as a rock or shell. The Rhodophyta or red algae are most commonly found at great depths and often contributes to the formation of coral reefs. Red algae are the only algae that's cells do not contain flagella. Rhodophyta is red due to the pigment phycoerythrin, which causes the algae to reflect red light and absorbs blue light.



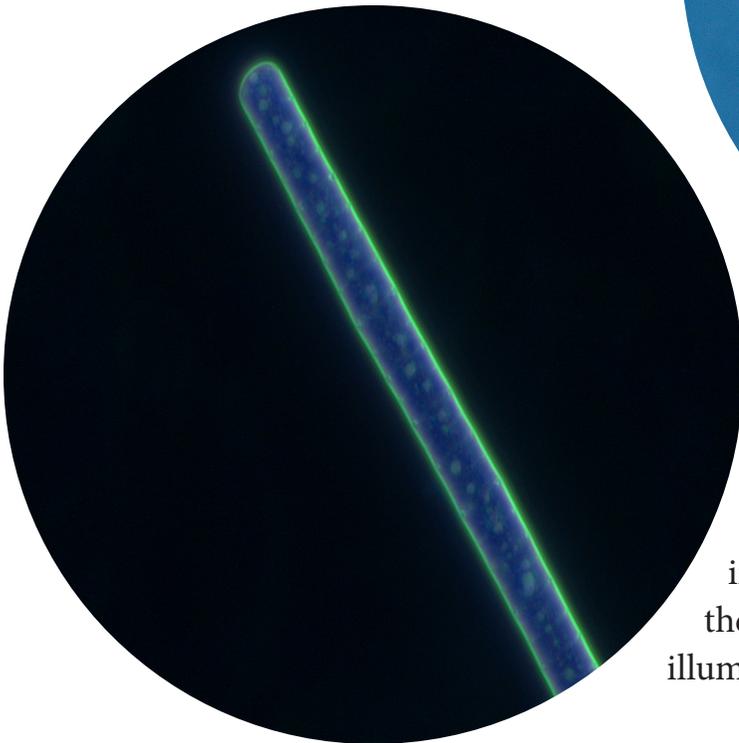
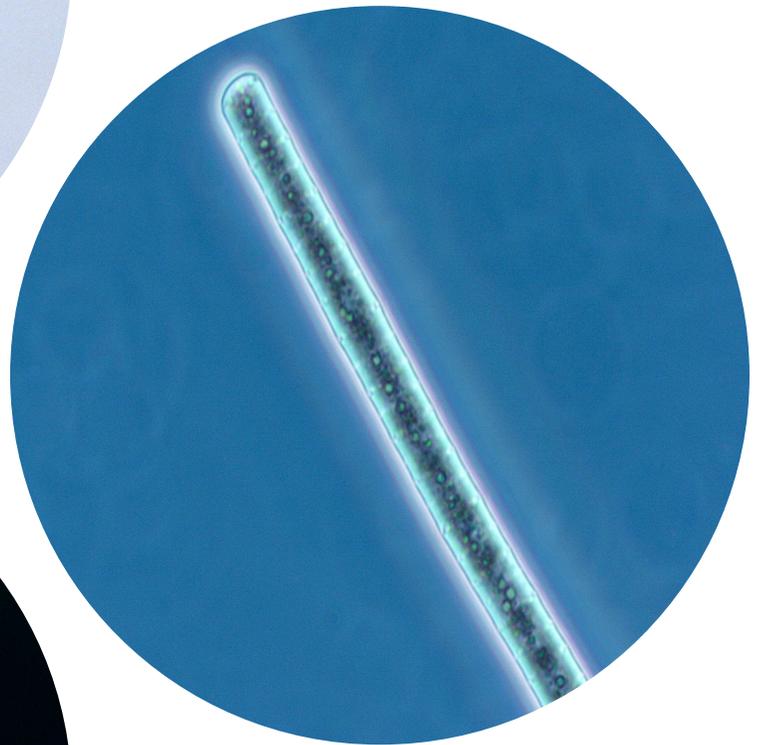
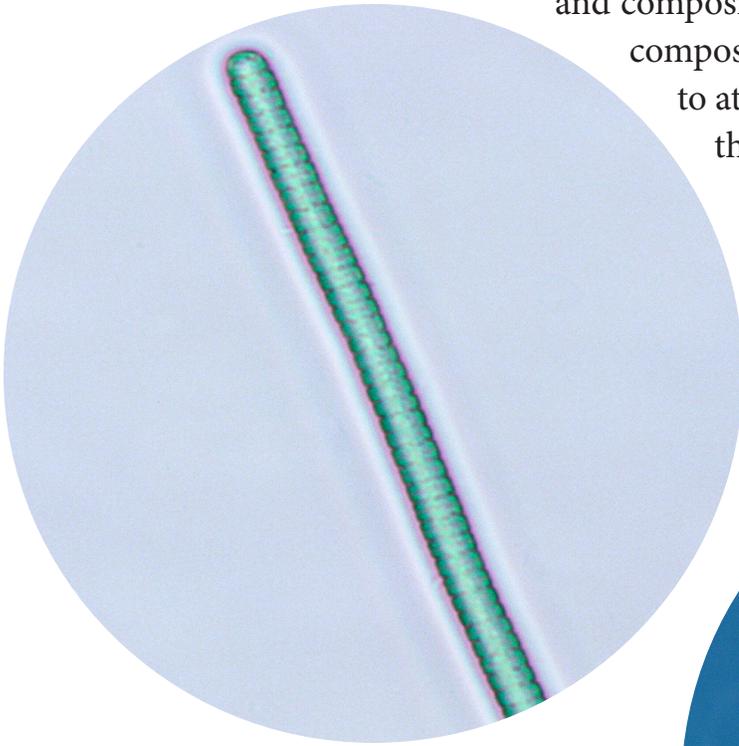
Green Algae



Green algae are a part of the phylum Chlorophyta within the Plantae kingdom. Chlorophyta is most commonly found in fresh water or marine water. They need plenty of sunlight, which is why they are mostly near the surface or in shallow water. Chlorophyta has a color that ranges from dark to light green. The variation is caused by a combination of two pigments, beta-carotene and xanthophylls. The beta-carotene pigment in this algae has many benefits as cancer treatment. The growth of green algae has recently been announced to help reduce global warming because it absorbs the carbon dioxide.

Ulothrix

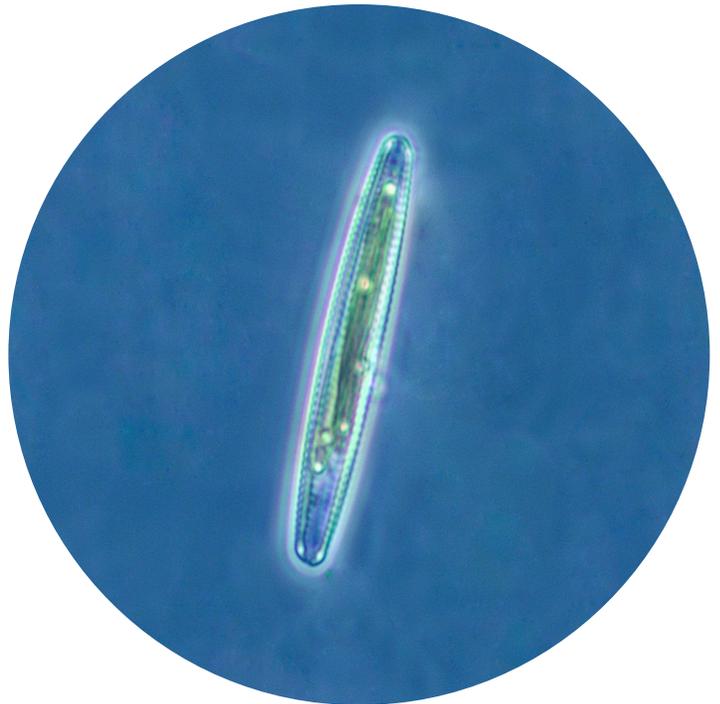
Ulothrix is eukaryotic and unicellular. The body is barrel-shaped and composed of filaments. The ends are rounded and composed of the basal holdfast that enables them to attach to surfaces. Reproduction occurs when the body of the Ulothrix's breaks into two pieces forming an akinete, this process is also known as vegetative reproduction. Akinete formation contains food reserves and when it is ready it will become a new plant.



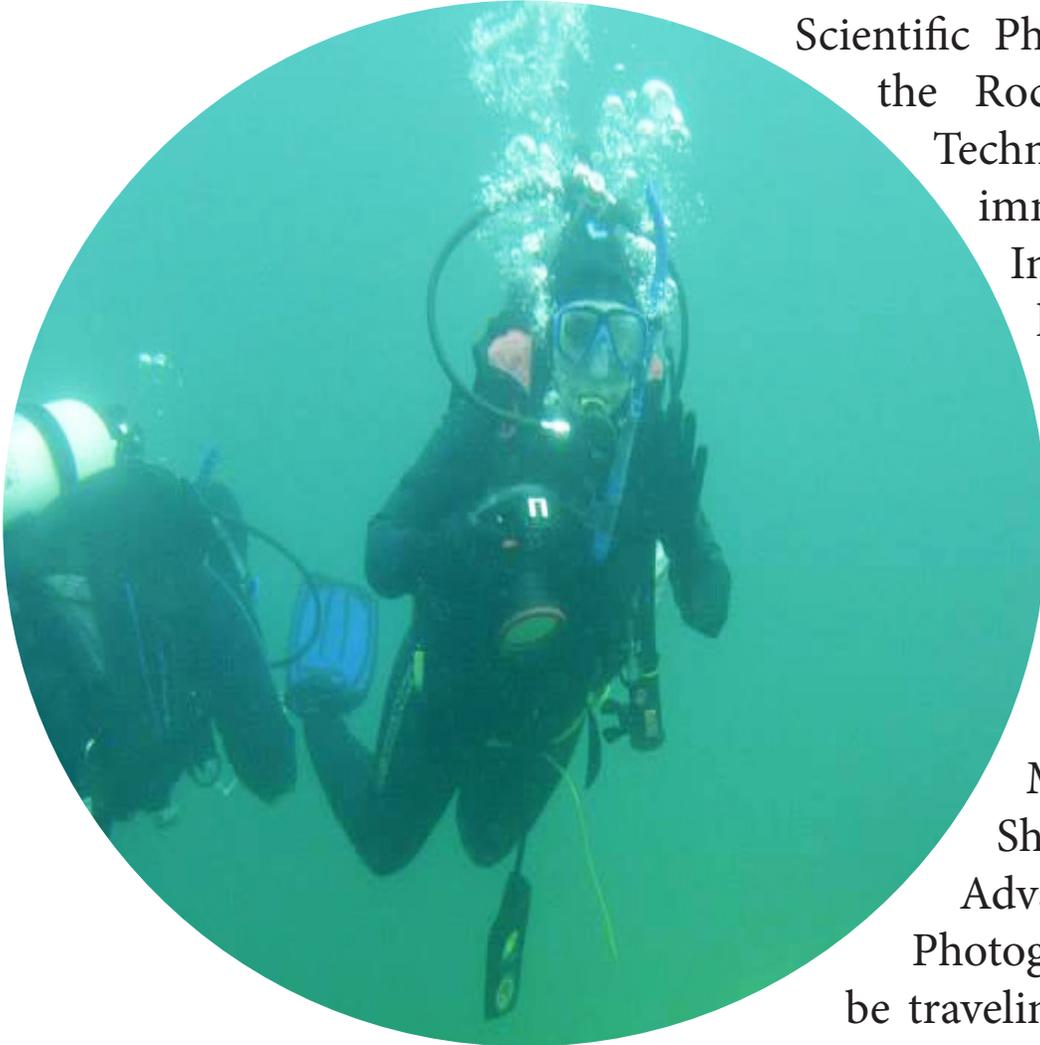
All images on this page were taken with a Zeiss microscope at 40x. The top left image is taken under brightfield illumination. The image above is taken using phase contrast and the image to the left is taken using darkfield illumination.

Photomicrography

The microscope images shot for this article were taken with the Zeiss Axio microscope. This microscope has an axiocam 105 color camera attached to the imaging tube. Along with their software called ZEN, Zeiss has made photomicroscopy easy with their new innovative system. The microscope itself not only has brightfield illumination but also allows you to easily switch to darkfield and phase contrast. There are some flaws in the software that make things difficult, for example when attempting to batch save images, the program requires you to select the file type and location for each individual image. Although there are some problems, the software enables you to take highly magnified images that are high quality with a simple click of the mouse. It also gives you settings to enhance your exposure such as the ability to change the maximum and minimum points of the histogram.



About the Author



Julie Kamine is currently a fourth year Scientific Photography major at the Rochester Institute of Technology. She is also immersing in Social Inequalities and has her Associates degree in Photographic Imaging. For her final semester at RIT she is exciting to be taking Confocal and Scanning Electron Microscopy. She is also taking Advanced Underwater Photography were she will be traveling abroad to dive in the beautiful waters of Bonaire.

Email: jak9035@rit.edu

Resources:

<http://www.ecology.com/2011/09/12/important-organism/>

<http://marinelife.about.com/od/plants/tp/typesofalgae.htm>

<http://en.wikipedia.org/wiki/Ulothrix>